

# Student success in cooperative education: A comparison of remote and in-person workplace performance evaluations

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Cooperative education (co-op) programs combine coursework and work internships and have become popular worldwide. Using over 45,000 performance evaluations collected separately for in-person (2019) and remote (2021) internship positions, this study uncovered the characteristics of successful co-op students. Each evaluation included an overall performance rating and written comments and recommendations provided by the supervisor. By using logistic regression and word frequency counting to analyze supervisors' general and recommendation comments, the most successful students were found to be excellent leaders and innovators, with remote students also being praised for their independence. Remote students were encouraged to be innovative and learn technological skills, while in-person students should improve oral communication and presentation abilities. These findings highlight important skills that students should acquire in their early careers.

Keywords: Cooperative education, remote work, student success, workplace performance assessment, machine learning, logistic regression

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Cooperative education (co-op) is a type of work-integrated learning in which students alternate between classroom study terms and paid work terms. Co-op programs have become popular worldwide as a way for students to acquire practical experience, a talent pipeline for employers, and a recruiting tool for universities (Haddara & Skanes, 2007; Thiel & Hartley, 1997).

According to recent work, the co-op job market is competitive (Jiang & Golab, 2016; Parsa & Golab, 2020; Toulis & Golab, 2017), especially since the COVID-19 pandemic, when many co-op positions were cancelled (Kay et al., 2020). Furthermore, many students count on being hired permanently by a former co-op employer after graduation (Anderson et al., 2012). It is therefore important for students to make a good first impression in their early careers.

During the COVID-19 pandemic, many positions switched partially or entirely to remote work (Kay et al., 2020). This necessary increase in the number of remote positions has normalized remote work, with many current positions still offering remote options. As a result, it is important for employers, institutions, and students to understand what makes students successful in remote co-op positions and how this may differ from success in in-person positions. This motivates the research questions studied in this paper:

1. Which skills, abilities, and attributes make co-op students successful?
2. How do the most valued skills differ for remote and in-person positions?
3. Where should students improve to be most successful in remote and in-person positions?

The purpose of this article is to explore these questions by analyzing over 23,000 remote and over 22,000 in-person co-op performance evaluations collected by a large North American university. This

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secondary data analysis aims to uncover key differences in remote and in-person evaluations and recommend skills that will enable students to be more competitive in the cooperative job market.

The next section reviews existing literature on remote and in-person cooperative work positions, followed by an overview of the secondary data used for this study. The results of analyzing two types of feedback written by workplace supervisors at the end of cooperative work terms are then presented. Finally, practical implications are discussed, along with recommendations for ways that students, employers, and institutions can be more successful in cooperative education programs.

Permission for this secondary data analysis was granted by the university's office of research ethics (application number 43970) on January 11, 2022.

## RELATED WORK

### *Employers' Expectations of In-person Co-op Students*

Closely related works on understanding employers' expectations of (in-person) co-op students were conducted by Nevison et al. (2018) and Coll et al. (2002). Nevison et al. surveyed 376 co-op employers who stated that the most important workplace competencies are relevant work experience and the quantity of work done. Coll et al. surveyed 172 co-op employers who suggested that the most important attributes of new graduates entering the workforce are willingness to learn, teamwork, initiative, and analytical thinking. To the best of the authors' knowledge, this study is the first to explore employers' expectations in the context of remote co-op, based on the results of over 23,000 remote performance evaluations compared with over 22,000 evaluations from in-person positions.

### *Employers' Perceptions of In-person Co-op Students*

There are also studies of co-op employers' perceptions of student competencies (prior to remote working), and whether these perceptions change based on gender and seniority (Chopra et al., 2019, 2020; Jiang et al., 2015). One study found that in-person co-op students were rated most highly on response to supervision, ability to learn, and interpersonal skills, and the lowest on leadership and creativity (Jiang et al., 2015). Studies also found that female students and students with more work experience were rated higher in almost all evaluation categories (Chopra et al., 2019, 2020; Jiang et al., 2015). Instead of analyzing co-op employers' perceptions of student competencies, this study analyzes co-op employers' expectations of remote employees to understand if similar expectations persist before and after the switch to remote co-op.

### *Remote Cooperative Education*

Recent work on remote co-op has focused on making remote work placements beneficial for students (Alanson et al., 2020; Bowen, 2020; Dean & Campbell, 2020) and the challenges arising from the transition from in-person to remote co-op (Bowen, 2020; Goldman & Sterling, 2020; Jeske & Linehan, 2020; Pretti et al., 2020). In remote work, students must infer workplace culture and supervisor expectations through short virtual interactions where they previously had the opportunity to immerse themselves in a physical workplace. Studies note that this is an important factor for success in remote co-op positions (Dean & Campbell, 2020; Pretti et al., 2020), showing the importance of understanding employer expectations. Thus, this study fills a gap by examining co-op employers' expectations of remote student employees, which may aid in the success of remote co-op programs.

### *Post-Graduate Employment*

In the broader context of post-graduate employment, studies have focused on remote employees' experiences, perceptions, expectations, and well-being (Baert et al., 2020; Belostecinic et al., 2022; Fana et al., 2020; Felstead & Henseke, 2017; Harris, 2003; Petcu et al., 2021; Raišienė et al., 2020; Stephens & Szajna, 1998). Past studies found that satisfaction and productivity in remote employees increased with strong communication, trust with one's supervisor, and clarity of evaluation and feedback (Baker et al., 2006; Raghuram et al., 2001). However, no previous work studying employers' expectations from and satisfaction with remote workers was found by the authors. Consequently, this study focuses on employer expectations in a remote context, rather than the experiences of employees.

### DATA OVERVIEW

This analysis was performed using undergraduate co-op performance evaluations collected by a large North American university. The evaluations were completed by workplace supervisors at the end of work terms. At this university, most students in the co-op program alternate between four-month study terms, during which they take courses related to their degree, and work terms where they are hired for a work placement. Students are required to complete between four and six work terms to complete their degree. In this dataset, most work placements (91.5%) were four months in length, while the rest were eight months (7.8%) or two months (0.7%) duration.

Approximately half of the evaluations correspond to positions from 2019, while the remaining evaluations were from positions in 2021. With high confidence, all or almost all positions in 2019 were believed to be in-person, while positions in 2021 were believed to be remote. This was based on publicly available data on government lockdown restrictions and information from employees working directly in the institution's co-op program. Therefore, for the purposes of this analysis, positions in 2019 were treated as in-person and positions in 2021 as remote. Because the sudden switch to remote work in winter 2020 led to many positions being disrupted without warning (partially in-person and partially remote), no data from 2020 was included in the analysis. In total, anonymized student data and employer evaluations for 22,134 in-person and 23,417 remote work placements were incorporated into the analysis. For each placement, the dataset includes:

- Overall Performance Rating: on a 7-point scale, with the categories labelled as (in order from 1 to 7) unsatisfactory, marginal, satisfactory, good, very good, excellent, and outstanding.
- Supervisor's Comments: optional comments written by the supervisor to explain their choice of evaluation rating for the given student.
- Recommendation Comments: optional comments written by the supervisor to discuss areas for improvement and skills the student should develop.

Demographic information was also included for each evaluation. Students were evaluated from eight faculties: Engineering (39.4%), Mathematics (25.4%), Science (9.1%), Arts (13.2%), Environment (6.1%), Health (2.9%), Applied Health Sciences (2.0%), and Interdisciplinary Studies (1.9%). Notably, nearly three-quarters (73.9%) of evaluations corresponded to students in Science, Technology, Engineering, and Mathematics (STEM) related fields. Of these student evaluations, 42.4% corresponded to students identifying as female, 56.6% male, and 1% other. Finally, each evaluation was also labelled with the number of work terms completed by the given student (including the one currently being evaluated). This information can be found in Table 1. Preliminary investigations comparing different demographic groups (including faculty, gender, and number of completed work terms) did not uncover any significant differences, so these were not used as control variables.

TABLE 1: The number of work terms completed by each student, at the time of evaluation.

Work Term Number	Percentage of Student Evaluations
1	22.2%
2	20.4%
3	18.5%
4	17.0%
5	12.9%
6	8.1%
7+	0.9%

*Note.* Because evaluations occur at the end of the work term, students on their first work term have completed one work term and are assigned a work term number of one.

In 2020, a new evaluation form was introduced for co-op employers to evaluate their students, following the development of the Future Ready Talent Framework (Pretti et al., 2021), a conceptual model of the most relevant skills for co-op students. Although the sections for written comments did not change, there were changes in wording to other parts of the form. Specifically, different terminology was used for describing students' skills. For example, a skill called "Teamwork" in the 2019 form was referred to as "Collaboration" in the 2021 form. This change is mentioned here because it may have affected the words used by supervisors to describe students' skills, producing superficial differences between the 2019 and 2021 evaluations that are not related to the switch from in-person to remote work. These differences are explored in more detail in the discussion section.

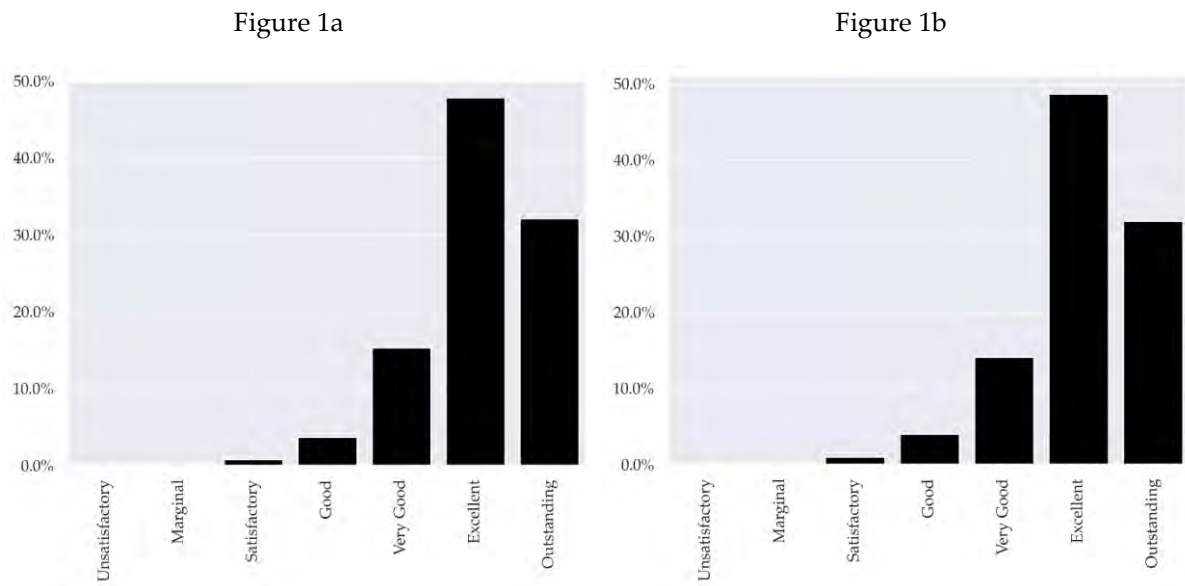
The overall performance rating distribution for all student placements is shown in Figure 1a for 2019 and Figure 1b for 2021. In 2021, the majority (80.7%) of all students received a rating of excellent or outstanding. Only nine students (0.04%) in the 2021 data received a rating of unsatisfactory, failing to meet employer expectations. The distribution was similar in the 2019 evaluations, indicating that students are not perceived as being either more or less successful by their employers in remote positions.

## METHODS

### *Logistic Regression to Determine What Makes Students Successful*

Supervisor comments were investigated using a logistic regression classifier (McCullagh, 2019) to reveal aspects of successful co-op students. Generally, unstructured text data such as a supervisor's comments requires preprocessing. In this dataset, supervisors often left short comments that did not contain useful information about a student's skills, such as "comments included" or "good job." For this analysis, all comments shorter than 25 characters were removed. This threshold was selected through manual inspection to ensure that most non-useful comments would be removed. This process resulted in 3,841 records being removed from the analysis in the remote data and 2,246 from the in-person data.

FIGURE 1: Distribution of overall performance ratings in student evaluations. Figure 1a corresponds to the ratings from 2019 evaluations, while Figure 1b is from 2021.



The Natural Language Toolkit (NLTK) word tokenizer (NLTK, 2022) was used to divide each sentence into individual words, which were converted to lowercase and stripped of punctuation. Stop words are common words (such as *the*, *and*, or *should*) which are often deliberately ignored by classifiers because they do not contain important meaning (HaCohen-Kerner et al., 2020). Thus, words from the NLTK English stop word list were removed before applying the NLTK Snowball Stemmer (NLTK, 2022) to convert words with similar meanings to a common representation. For example, the Snowball Stemmer converted both 'innovated' and 'innovator', which are both related to the skill of innovation, to the term *innov*.

The next step in preprocessing was to convert the text to a vector representation. Each comment produced a vector, a list of  $n$  coordinates corresponding to each of the  $n$  words in the vocabulary. For a given comment, the  $i^{\text{th}}$  coordinate was equal to one if the word was present in that comment, and zero otherwise. Each coordinate was then multiplied by the total number of comments and divided by the number of comments in which the corresponding word appeared. For example, if the word 'design' appeared in 1,000 out of 22,000 comments, the coordinate corresponding to 'design' would be 22 if 'design' appeared in the given comment, and 0 otherwise. This is a measure of how rare the given word is in the set of comments overall. This was done to place more emphasis on rare words that are present in only a few documents (such as a student's skills) instead of words that appear in almost every document and therefore will not help distinguish outstanding students. Finally, both unigrams (single words) and bigrams (pairs of consecutive words) were included in the analysis as features for logistic regression.

Using these data, a logistic regression classifier was applied to the 2019 and 2021 datasets separately to make a binary prediction: whether or not a student received a rating of outstanding, the highest possible evaluation category. As these were the most successful students according to co-op employers,

the classifier was expected to learn what differentiates these outstanding students from others. Next, the classifiers were evaluated using 10-fold cross validation, a standard technique for measuring classification accuracy. In this case, accuracy is defined as the number of correct predictions divided by the total number of predictions. For example, a perfect classifier would achieve an accuracy of 100% by correctly predicting, for all students, whether or not they received a rating of outstanding.

Logistic regression classifiers were used for this analysis because they are easy to implement and interpret. By examining the model weights after training a logistic regression classifier, it is possible to understand which words in the original comments were most strongly associated with outstanding and non-outstanding students. Therefore, 100 terms with the highest model weights and 100 terms with the lowest weights were identified, corresponding to terms that most strongly predicted a label of outstanding and not outstanding, respectively. These terms were selected out of 150,000 total words and pairs of words from each dataset because they best differentiated between the two groups of students. This was done using the eli5 Python module (Korobov & Lopuhin, 2017). To isolate the skills and attributes of the most successful students, only the top terms that were not common English words are reported.

This analysis was applied separately to the data from 2019 and 2021, and the top and bottom terms compared to detect differences between the most important skills for each group of students.

#### *Supervisor Recommendations: Frequency Analysis*

Although a logistic regression model can easily identify which skills differentiate recommendations in remote and in-person settings, these skills are not necessarily the most frequent. For example, remote supervisors may recommend improving a skill such as independence more often than in-person supervisors, but this may not be a common recommendation overall. Therefore, to understand which improvements were most recommended by supervisors, a frequency analysis was performed on the supervisor recommendations text field. Preprocessing was performed in the same way as for the logistic regression analysis described above using the NLTK toolkit to convert the text to lowercase, remove punctuation and stop words, and apply a stemmer to each individual word.

When examining the most frequent words individually, it is difficult to extract meaningful skills due to lack of context. For example, if a frequent word is 'ethic', we cannot be certain if it refers to a student's work ethic or to their ability to act ethically towards colleagues, superiors, and customers. However, by examining pairs of words, it is possible to identify skills with more certainty. Therefore, words were counted in overlapping pairs called *bigrams*. For example, in the phrase 'problem solving skills', the bigrams 'problem solving' and 'solving skills' would be counted separately. After preprocessing, similar phrases such as 'problem solving' and 'problem solve' would be treated as the same phrase *problem solv* (after stemming), so they could be counted together.

This analysis was repeated three times using:

1. Recommendations from in-person evaluations only.
2. Recommendations from remote evaluations only.
3. Recommendations from both in-person and remote evaluations combined, to understand which recommendations were made most frequently overall.

After counting all bigrams, the forty most frequent were reported. This threshold was selected because it includes at least the top 10 skill-related words or phrases for each analysis, while being short enough to include in this paper.

#### *Supervisor Recommendations: Logistic Regression*

The supervisor recommendations text field was analyzed using a logistic regression classifier to identify differences between the recommendations given by 2021 supervisors and those given in 2019. The classifier was trained using the recommendation comments from 2019 and 2021 to predict one of the following two labels:

- In-person, if the recommendation comment was from 2019, or
- Remote, if the recommendation comment was from 2021.

The goal of this process was to identify the features that most strongly distinguish remote recommendations from those given to in-person students. For this, eli5 was used to display the top 100 terms that most strongly predicted a label of in-person and the bottom 100 terms that most strongly predicted a label of remote. These terms were compared to identify differences in the recommendations made for remote and in-person students. All preprocessing steps were identical to those used in the above logistic regression classifiers used to identify what makes students successful.

## RESULTS

### *Logistic Regression to Determine What Makes Students Successful*

In the 2021 data, out of 23,417 total student evaluations, 19,204 performance evaluations were kept after removing short supervisor comments. Of these students 37.5% were given a performance evaluation rating of outstanding by their employer, while the remaining 62.4% were given a lower overall rating, from excellent to unsatisfactory. For the purposes of classification, these remaining students were considered to be *not outstanding*. The logistic regression classifier achieved an average prediction accuracy of 79.6% using 10-fold cross validation. A majority-class baseline model that simply predicts *not outstanding* for every student would only achieve an accuracy of 62.4%. The logistic regression model improves upon this baseline, indicating that it has learned important differences between outstanding and non-outstanding students. These results were similar for the 2019 data, where 19,888 evaluations were kept after removing short supervisor comments, with 35.1% corresponding to outstanding students. Although a baseline majority class classifier would produce an accuracy of 64.9%, the logistic regression classifier trained on the 2019 data achieved an accuracy of 80.3%, again showing an ability to learn important patterns from the data.

The model weights of the logistic regression classifier were examined to understand which terms are the strongest predictors of an outstanding student. After discarding terms that are not related to a student's skills, abilities, or knowledge (for example *went*, *expect*, and *student*), only the top 100 most and least predictive terms are kept for analysis.

Tables 2 and 3 (2021) and Tables 4 and 5 (2019) summarize the relevant terms that most strongly predicted an overall performance rating of outstanding along with their weight. Tables 2 and 4 list terms that are more likely to be present for (and therefore predict) outstanding students, while Tables 3 and 5 list terms that instead predict non-outstanding students. Each term's weight is either positive or negative. If a term has a positive weight, it indicates that a student with that term in their evaluation

is more likely to receive a rating of outstanding. On the other hand, a term with a negative weight indicates that a student is likely to receive a non-outstanding rating. The magnitude reflects how strongly the term predicts the given label. More extreme values are better predictors. The original text column shows the words in the original text that produced these terms. This allows the reader to understand how terms in the table correspond to words written by the supervisor. For example, the term *outstand* was produced from the words 'outstanding', 'outstandingly', 'outstand', or 'outstandings' through preprocessing. The words in this column have been lowercased and punctuation removed to prevent multiple entries for words such as 'Outstanding' and 'outstanding', but they are otherwise identical to words appearing directly in the comments. The original words are presented in order from most to least frequent, and in the case where there are more than five original words, only the top five most frequent are presented for brevity. Finally, only meaningful skill-related terms were kept, so the rank column is included to show the position of the included terms in the ranking. If a value from 1 to 100 is missing from this column, it indicates that that term was not meaningful and was removed. Some examples of removed terms include *went*, *student*, *company*, *amaz* (amazing), *incred* (incredible), *intern*, *year*, and *level*. These terms were removed because they do not help to explain what skills, abilities, and attributes differentiate outstanding students. For transparency, the full tables can be viewed in Appendix A Tables 1-4 to examine the terms that were removed.

Overall, many of the strongest predictors were common to students in both 2019 and 2021. Both remote and in-person outstanding students were characterized as good leaders, designers, and innovators, based on the presence of terms *lead*, *design*, and *innov* in both Table 2 and Table 4. However, notably, the term *independ* was a predictor of a remote outstanding student, while the term *work independ* predicted a non-outstanding student in in-person settings. This suggests that independence may be a skill that is more valued in remote settings. Further analysis of these results will be presented in the discussion section.



TABLE 2: A selection of the top 100 terms predicting an outstanding student in 2021 evaluations of mostly remote positions.

Rank	Term	Weight	Original Text
1	outstand	16.846	"outstanding", "outstandingly", "outstand", "outstandings"
3	expect	4.510	"expectations", "expected", "expectation", "expect", "expecting"
9	exceed	3.349	"exceeded", "exceed", "exceeding", "exceeds", "exceedingly"
14	lead	3.127	"leadership", "lead", "leading", "leads", "leaded"
19	fulltim	2.874	"fulltime", "fulltimer", "fulltimers", "fulltimes"
23	product	2.721	"product", "production", "productive", "products", "productivity"
25	deliv	2.677	"deliver", "delivered", "delivering", "delivers", "delivered"
27	problem	2.670	"problem", "problems"
29	hire	2.619	"hire", "hired", "hiring", "hires", "hirings"
32	engin	2.450	"engineering", "engineer", "engineers", "engine", "engines"
33	design	2.413	"design", "designs", "designing", "designed", "designer"
35	critic	2.381	"critical", "criticism", "critically", "criticisms", "criticize"
36	implement	2.321	"implementation", "implement", "implemented", "implementing", "implementations"
39	featur	2.305	"features", "feature", "featured", "featuring", "featureful"
41	impact	2.289	"impact", "impactful", "impacted", "impacts", "impacting"
43	servic	2.224	"service", "services", "servicing", "serviceability", "serviceable"
45	custom	2.175	"customer", "customers", "custom", "customizing", "customized"
50	constant	2.056	"constantly", "constant", "constants"
51	initi	2.046	"initiative", "initial", "initiatives", "initially", "initiate"
52	innov	2.034	"innovative", "innovation", "innovate", "innovations", "innovating"
53	solut	2.030	"solutions", "solution", "solutioning", "solutation", "solutioned"
58	dedic	1.993	"dedication", "dedicated", "dedicate", "dedicating", "dedicates"
63	quick	1.898	"quickly", "quick", "quickness"
70	new	1.794	"new", "newness"
73	organ	1.771	"organization", "organized", "organizing", "organize", "organizations"
74	scope	1.770	"scope", "scoping", "scoped", "scopes"
77	code	1.740	"code", "coding", "codes", "coded", "codeing"
86	consist	1.664	"consistently", "consistent", "consistency", "consistently", "consisted"
87	cultur	1.638	"culture", "cultural", "cultures", "culturally", "cultural"
91	qualiti	1.564	"quality", "qualities"
92	independ	1.554	"independently", "independent", "independence", "independantly", "independant"
96	model	1.524	"model", "models", "modeling", "modelling", "modelled"
97	care	1.503	"care", "carefully", "careful", "cares", "caring"
98	complex	1.490	"complex", "complexity", "complexities", "complexed", "complexes"
99	fast	1.485	"fast", "fastly", "fasted"

TABLE 3: A selection of the top 100 terms predicting a non-outstanding student in 2021 evaluations of mostly remote positions.

Rank	Term	Weight	Original Text
1	overall	-4.612	"overall"
8	remot	-1.980	"remote", "remotely"
16	met expect	-1.695	"met expectations", "met all expectations", "met our expectations", "met the expectations", "met my expectations"
22	struggl	-1.381	"struggled", "struggle", "struggling", "struggles"
25	ask question	-1.333	"ask questions", "asking questions", "ask more questions", "asked questions", "asks questions"
34	friend	-1.12	"friendly", "friends", "friend"
38	confid	-1.072	"confidence", "confident", "confidently", "confidant", "confidence"
39	assign time	-1.069	"assignments on time", "assigned to him in a timely", "assignments in a timely", "assigned to her in a timely", "assignment on time"
41	time manner	-1.037	"timely manner", "time manner", "timely manners", "time in the manner", "timing manner"
42	work home	-1.037	"working from home", "work from home", "worked from home", "working at home", "works from home"
44	comfort	-1.024	"comfortable", "comfort", "comfortably", "comfortability", "comforted"
49	learn	-1.008	"learn", "learning", "learned", "learns", "learnings"
52	virtual	-0.992	"virtual", "virtually", "virtualization"
59	remot work	-0.944	"remote work", "remote working", "remotely working", "remotely for this work", "remote from work"
64	hard worker	-0.922	"hard worker", "hard of a worker"
71	improv	-0.879	"improve", "improvement", "improved", "improving", "improvements"
77	improv term	-0.819	"improved over the term", "improvement over the term", "improvement in terms", "improved as the term", "improvement this term"
82	ask help	-0.806	"ask for help", "asking for help", "asked for help", "asks for help", "asked to help"
94	engag	-0.755	"engaged", "engagement", "engage", "engaging", "engagements"
95	follow instruct	-0.748	"follow instructions", "followed instructions", "follows instructions", "following instructions", "follow the instructions"
97	perform task	-0.735	"perform tasks", "performing tasks", "perform the tasks", "performed all tasks", "performed tasks"
100	manag workload	-0.723	"manage her workload", "manage his workload", "managed her workload", "manage workload", "manage workloads"

TABLE 4: A selection of the top 100 terms predicting an outstanding student in 2019 evaluations of mostly in-person positions.

Rank	Term	Weight	Original Text
1	outstand	17.581	"outstanding", "outstandingly", "outstand", "outstandings"
3	expect	4.489	"expectations", "expected", "expectation", "expect", "expecting"
4	exceed	4.123	"exceeded", "exceed", "exceeding", "exceeds", "exceedingly"
6	fulltim	3.958	"fulltime", "fulltimer", "fulltimers", "fulltimes"
14	hire	3.287	"hire", "hired", "hiring", "hires", "hirings"
15	lead	3.236	"leadership", "lead", "leading", "leads", "leaded"
25	engin	2.643	"engineering", "engineer", "engineers", "engine", "engines"
31	solut	2.450	"solutions", "solution", "solutioning", "solutation", "solutioned"
33	idea	2.368	"ideas", "idea"
35	graduat	2.316	"graduate", "graduation", "graduates", "graduated", "graduating"
38	complex	2.265	"complex", "complexity", "complexities", "complexed", "complexes"
40	design	2.200	"design", "designs", "designing", "designed", "designer"
43	critic	2.167	"critical", "criticism", "critically", "criticisms", "criticize"
49	respons	2.130	"responsibilities", "responsibility", "responsible", "responsive", "response"
50	impact	2.121	"impact", "impactful", "impacted", "impacts", "impacting"
54	deliv	2.049	"deliver", "delivered", "delivering", "delivers", "delived"
55	innov	2.039	"innovative", "innovation", "innovate", "innovations", "innovating"
56	consist	2.026	"consistently", "consistent", "consistency", "consistently", "consisted"
62	insight	1.975	"insights", "insight", "insightful", "insightfulness"
63	develop	1.929	"development", "develop", "developing", "developed", "developer"
65	implement	1.926	"implementation", "implement", "implemented", "implementing", "implementations"
66	product	1.925	"product", "production", "productive", "products", "productivity"
78	contribut	1.838	"contributions", "contributed", "contribute", "contribution", "contributing"
80	featur	1.835	"features", "feature", "featured", "featuring", "featureful"
84	research	1.805	"research", "researching", "researched", "researcher", "researchers"
89	dedic	1.767	"dedication", "dedicated", "dedicate", "dedicating", "dedicates"
96	challeng	1.719	"challenges", "challenging", "challenge", "challenged", "challenger"
97	code	1.711	"code", "coding", "codes", "coded", "codeing"

TABLE 5: A selection of the top 100 terms predicting a non-outstanding student in 2019 evaluations of mostly in-person positions.

Rank	Term	Weight	Original Text
1	good	-4.311	"good", "goods", "goodly", "goodness"
2	overall	-2.428	"overall"
10	task	-1.860	"tasks", "task", "tasked", "tasking", "taskings"
14	ask question	-1.642	"ask questions", "asking questions", "ask more questions", "asked questions", "asks questions"
24	quiet	-1.377	"quiet", "quietly", "quietness"
33	sometim	-1.210	"sometimes", "sometime"
37	struggl	-1.163	"struggled", "struggle", "struggling", "struggles"
39	friend	-1.138	"friendly", "friends", "friend"
40	slow	-1.136	"slow", "slowing", "slowed", "slows", "slowness"
53	instruct	-0.959	"instructions", "instruction", "instructional", "instructed", "instructing"
55	improv	-0.950	"improve", "improvement", "improved", "improving", "improvements"
65	understand task	-0.906	"understand the task", "understand the tasks", "understanding of the task", "understanding of the tasks", "understand tasks"
66	engag	-0.901	"engaged", "engagement", "engage", "engaging", "engagements"
76	confid	-0.843	"confidence", "confident", "confidently", "confidant", "confidance"
79	clarif	-0.834	"clarification", "clarifications"
80	time manner	-0.832	"timely manner", "time manner", "timely manners", "time in the manner", "timing manner"
83	demonstr willing	-0.806	"demonstrated a willingness", "demonstrated willingness", "demonstrated his willingness", "demonstrates a willingness", "demonstrated the willingness"
87	work independ	-0.798	"work independently", "worked independently", "working independently", "works independently", "worked very independently"
88	divers	-0.798	"diverse", "diversity", "diversed", "diversely", "diversities"
93	assist	-0.774	"assist", "assistance", "assisted", "assistant", "assisting"
98	focus	-0.761	"focus", "focused", "focusing", "focuses", "focuse"

### *Supervisor Recommendations: Frequency Analysis*

There were 15,728 non-blank supervisor recommendation comments in 2019 and 14,166 comments in 2021. Comments that were left blank (i.e., not filled in by the supervisor) were discarded.

The analysis of frequent skills can be found in Table 6. This table shows the fifty most frequent bigrams for each of the in-person, remote, and all recommendation comments, along with the count, indicating the number of times the bigrams appeared across all recommendation comments in the given dataset. From the bigram column of these tables, the following top 10 skills were extracted, in order. Explanations of the original skills that produced these terms, which were deduced through manual inspection of supervisor recommendation comments containing these terms, are provided in brackets:

- In-Person:  
*ask question* (asking questions), *communic skill* (communication skills), *problem solv* (problem solving), *attent detail* (attention to detail), *technic skill* (technical skills), *take initi* (take initiative), *work ethic* (work ethic), *oral communic* (oral communication), *public speak* (public speaking), *softwar develop* (software development), and *written communic* (written communication).
- Remote:  
*ask question* (asking questions), *communic skill* (communication skills), *technic skill* (technical skills), *critic think* (critical thinking), *seek opportun* (seek opportunities), *take initi* (take initiative), *profession develop* (professional development), *softwar develop* (software development), *work ethic* (work ethic), and *attent detail* (attention to detail).
- Both (in-person and remote combined):  
*ask question* (asking questions), *communic skill* (communication skills), *technic skill* (technical skills), *problem solv* (problem solving), *take initi* (take initiative), *attent detail* (attention to detail), *softwar develop* (software development), *work ethic* (work ethic), *profession develop* (professional development), *critic think* (critical thinking).

#### *Supervisor Recommendations: Logistic Regression*

The results of the logistic regression analysis can be found in Tables 7 (terms that predict remote students) and 8 (terms that predict in-person students). For brevity, only a selection of the top terms are included. However, removed terms can be examined in Appendix B Tables 5-6, where the tables are listed in full. As in Tables 2-5, the weight is either negative for in-person and positive for remote, while the magnitude of the weight shows how strongly it predicts whether or not a student is remote. The rank and original text columns are also as described in the logistic regression results to predict whether or not a student is outstanding. When making recommendations, in-person students were encouraged to improve their communication (especially verbal communication and presentation skills, based on the presence of terms such as *present*, *public speak*, *oral*, and *assert*), while remote students were encouraged to be more innovative (*innov*), curious (*curios*), and ask questions (*question*).

TABLE 6: The most frequent words (pairs of words) in recommendation comments written by the supervisor for in-person, remote, and all placements combined.

In-Person (2019)		Remote (2021)		All (2019 and 2021)	
Bigram	Count	Bigram	Count	Bigram	Count
would recommend	971	ask question	836	would recommend	1693
continu develop	803	continu develop	730	ask question	1639
ask question	803	work term	724	continu develop	1533
communic skill	789	would recommend	722	work term	1505
work term	781	continu work	499	communic skill	1279
continu work	763	communic skill	490	continu work	1262
would encourag	589	would encourag	470	would encourag	1059
would like	482	technic skill	459	would like	876
encourag continu	451	coop term	409	coop term	835
problem solv	441	continu learn	407	technic skill	817
coop term	426	critic think	397	encourag continu	797
good work	392	would like	394	continu learn	764
attent detail	384	encourag continu	346	good work	697
technic skill	358	learn new	307	problem solv	636
continu learn	357	good work	305	keep good	608
team member	347	area develop	279	take initi	595
make sure	344	keep learn	275	team member	583
take initi	341	develop skill	275	attent detail	583
keep good	334	keep good	274	learn new	577
continu improv	317	seek opportun	266	develop skill	565
great work	292	great work	258	make sure	561
develop skill	290	take initi	254	great work	550
work ethic	288	profession develop	252	recommend continu	522
take time	282	recommend continu	251	softwar develop	507
would benefit	279	softwar develop	245	continu improv	506
oral communic	279	continu build	244	would benefit	499
recommend continu	271	team member	236	work ethic	498
public speak	271	gain experi	233	profession develop	495
would also	270	career path	229	seek opportun	492
like see	270	futur career	224	critic think	486
learn new	270	would benefit	220	continu build	483
area improv	265	make sure	217	gain experi	482
softwar develop	262	work ethic	210	keep learn	475
written communic	260	continu seek	209	would also	473
futur work	255	futur work	208	futur work	463
present skill	251	would also	203	take time	451
gain experi	249	attent detail	199	area improv	450
profession develop	243	problem solv	195	like see	431
continu build	239	continu improv	189	also encourag	406
seek opportun	226	continu grow	185	continu seek	405

TABLE 7: A selection of the top 100 terms predicting a remote student (2021) from the supervisors' recommendation comments.

Rank	Term	Weight	Original Text
2	collabor	4.979	"collaboration", "collaborative", "collaborate", "collaborated", "collaborating"
3	innov	4.663	"innovative", "innovation", "innovate", "innovations", "innovating"
6	critic think	3.829	"critical thinking", "critically think", "critically thinking", "critical think", "critical thinkings"
8	mindset	3.391	"mindset", "mindsets"
9	critic	3.293	"critical", "criticism", "critically", "criticisms", "criticize"
12	selfmanag	2.664	"selfmanagement", "selfmanage", "selfmanaged", "selfmanaging", "selfmanageable"
14	technolog	2.432	"technologies", "technology", "technological", "technologically", "technolog"
16	learn	2.353	"learn", "learning", "learned", "learns", "learnings"
17	curios	2.311	"curiosity", "curiosities"
21	selfassess	2.114	"selfassessment", "selfassess", "selfassessments", "selfassessed", "selfassessing"
22	technic skill	2.112	"technical skills", "technical skill", "technically skilled", "technical and other skills", "technical and skill"
27	disciplin	1.888	"discipline", "disciplines", "disciplined"
31	innov mindset	1.849	"innovation mindset", "innovative mindset", "innovative mindsets", "innovate mindset", "innovating mindset"
36	communic	1.647	"communication", "communicate", "communicating", "communications", "communicated"
41	agil	1.557	"agile", "agility"
42	opportun	1.525	"opportunities", "opportunity", "opportune"
47	good communic	1.376	"good communication", "good communicator", "good at communicating", "good at communication", "good communications"
48	think critic	1.371	"think critically", "thinking critically", "thinks critically", "think more critically", "think about critical"
51	self manag	1.332	"self management", "self manage", "self managed", "self managing", "self manages"
52	opportun learn	1.322	"opportunities to learn", "opportunity to learn", "opportunities for learning", "opportunities and learning", "opportunity for learning"
53	make suggest	1.313	"make suggestions", "making suggestions", "make more suggestions", "make a suggestion", "make some suggestions"
58	question	1.230	"questions", "question", "questioning", "questioned", "questionable"
68	collabor communic	1.166	"collaboration and communication", "collaborate and communicate", "collaboration communication", "collaborated and communicated", "collaborating and communicating"
76	literaci	1.137	"literacy"
78	academ	1.130	"academic", "academics", "academically", "academe", "academical"
81	collabor skill	1.125	"collaboration skills", "collaborative skills", "collaboration skill", "collaborative skill", "collaborating skills"
85	confid speak	1.116	"confidence to speak", "confidence when speaking", "confidence in speaking", "confident to speak", "confident when speaking"
86	honest	1.113	"honest", "honestly"
92	technolog skill	1.094	"technological skills", "technology skills", "technologies and skills", "technology skill", "technological skill"
93	encourag think	1.088	"encouraged to think", "encourage him to think", "encourage you to think", "encourage her to think", "encourage him to do so i think"

TABLE 8: A selection of the top 100 terms predicting an in-person student (2019) from the supervisors' recommendation comments.

Rank	Term	Weight	Original Text
1	written	-2.795	"written"
2	interperson	-2.671	"interpersonal", "interpersonally", "interperson"
4	public speak	-2.246	"public speaking"
5	present	-2.118	"presentation", "presented", "present", "presentations", "presenting"
6	entrepreneuri	-2.064	"entrepreneurial", "entrepreneurialism", "entrepreneurially"
7	interperson communic	-1.931	"interpersonal communication", "interpersonal and communication", "interpersonal communications", "interpersonal and communications"
8	depend	-1.926	"dependable", "dependability", "depend", "depending", "dependencies"
9	proactiv	-1.868	"proactive", "proactively", "proactiveness", "proactivity", "proactivelys"
10	oral	-1.830	"oral", "orally", "orall"
11	assert	-1.827	"assertive", "assertiveness", "assert", "asserting", "assertively"
14	quiet	-1.749	"quiet", "quietly", "quietness"
15	problem solv	-1.725	"problem solving", "problem solve", "problems to solve", "problem solved", "problem to solve"
16	teamwork	-1.723	"teamwork", "teamworker", "teamworking", "teamworks"
17	public	-1.715	"public", "publication", "publications", "publicly", "publically"
18	oral communic	-1.701	"oral communication", "oral communications", "oral communicator", "oral and communication", "oral the communication"
20	speak	-1.661	"speaking", "speak", "speaks", "speaking"
21	punctual	-1.650	"punctual", "punctuality", "punctually", "punctuality"
23	interact	-1.562	"interactions", "interact", "interaction", "interacted", "interacting"
24	audienc	-1.555	"audience", "audiences"
25	enthusiasm	-1.532	"enthusiasm", "enthusiasms"
27	independ	-1.504	"independently", "independent", "independence", "independantly", "independant"
29	attent	-1.476	"attention", "attentive", "attentively", "attentiveness", "attentions"
30	peopl	-1.381	"people", "peoples"
33	solv skill	-1.337	"solving skills", "solving skill", "solveing skills", "solving these are skills"
35	document	-1.314	"documentation", "documents", "document", "documented", "documenting"
40	matur	-1.277	"maturity", "mature", "matures", "matured", "maturely"
41	languag	-1.269	"language", "languages"
42	problemsolv	-1.268	"problemsolving", "problemsolve", "problemsolver", "problemsolved"
47	lead	-1.221	"leadership", "lead", "leading", "leads", "leaded"
50	creativ	-1.189	"creative", "creativity", "creatively", "creativeness", "creativities"
52	improv written	-1.186	"improve his written", "improving written", "improve written", "improving his written", "improve her written"
66	listen	-1.130	"listening", "listen", "listens", "listener", "listened"
68	intuit	-1.129	"intuition", "intuitive", "intuit", "intuitively", "intuitions"
69	activ listen	-1.126	"active listening", "active listener", "actively listening", "actively listens", "actively listened"



70	consist	-1.122	"consistently", "consistent", "consistency", "consistently", "consisted"
71	verbal	-1.116	"verbal", "verbally", "verbalize", "verbalized", "verbalizing"
75	communic skill	-1.093	"communication skills", "communications skills", "communication skill", "communicative skills", "communications skill"
79	social	-1.072	"social", "socially", "socialize", "socializing", "socials"
86	opinion	-1.055	"opinions", "opinion", "opinionated"
97	present skill	-1.017	"presentation skills", "presentation skill", "presentations skills", "presenting skills", "presentational skills"

## DISCUSSION

### *A Comparison of Remote and In-Person Evaluations*

The analysis of supervisors' comments highlights skills that distinguish outstanding students in both remote and in-person settings. Outstanding students in both contexts are described as designers, innovators, and leaders. This result differs from prior work by Coll et al. (2002), who found that team leadership was one of the least important competencies, as perceived by employers. This indicates that the most successful students do not only produce good work; they also have the soft skills required to innovate, design novel solutions, and demonstrate leadership.

For remote students, independence (through the presence of the term *independ*) was found to be a strong predictor of an outstanding student. However, the term *independ* was found to strongly predict an outstanding student in remote settings while *work independ* predicted a non-outstanding student in in-person settings. To better understand this result, a more in-depth manual analysis was performed to analyze comments that contained these keywords. Through this analysis of comments mentioning independence, it was found that:

- Independence was usually mentioned in a positive way to praise a student's ability to produce work or solve problems independently. However, too much independence could be a negative trait. For example, some employers stated that their student was too independent and did not collaborate well with others.
- Independence was usually only one of many skills mentioned by the employer. Although independence was important, it was not the sole distinguishing factor for an outstanding student.
- Students at all performance evaluation levels were praised for their independence, but students with higher performance ratings (excellent and above) were more likely to receive a positive comment than those with lower ratings (good and below).
- In remote settings, many employers discussed the student's ability to succeed despite working remotely, showing that independence was an asset for this remote work. Also, independence was associated with initiative: being proactive, seeking new tasks, solving their own problems, and developing useful novel features independently.
- In in-person settings, employers seemed more likely to mention a student's flexibility – for example, that the student was both independent and a good collaborator.

This result differs from the work of Nevison et al. (2018), who found that independence only had medium importance. Overall, independence and related skills such as self-management appear to be more important in remote work where students cannot be directly supervised most of the time.

Interestingly, the term *cultur* points to remote outstanding students commonly having a cultural awareness or fitting well into workplace culture. Culture was highly rated in the study by Nevison et al. (2018), so this finding aligns with prior work.

For in-person students, the term *idea* was a strong predictor of an outstanding student. However, when examining the context in which this word is used, it was found that it is used in a similar way to *innov* (e.g., a student bringing fresh and creative ideas). Although it may support innovation being more important in in-person settings, it is possible this is the result of wording changes in the evaluation form: the word 'ideas' appears seven times in the detailed skill descriptions in the 2019 form, but only once in the 2021 form. A second term of importance is *research*. It was found to be related not only to a student's ability to work as a research assistant, but also a student's ability to seek solutions to problems and learn independently in general.

#### *Supervisor Recommendations for Remote and In-Person Positions*

Supervisors of both in-person and remote students commonly recommended that students be more inquisitive, with asking questions being the most frequent recommendation. Furthermore, good communication was recommended more frequently than technical and software development skills regardless of context. Other important skills include taking initiative, attention to detail, and work ethic, although notably work ethic is more frequently recommended for remote students rather than in-person students. This may be the result of students feeling less motivated to do work from home, so a good work ethic is more valuable to employers.

When making recommendations, supervisors of in-person students were more likely to recommend presentation or communication skills, as can be observed from the top terms *written*, *interperson* (e.g., interpersonal communication), *public speak* (e.g., public speaking), and *present*. This may be a result of in-person students having more need to interact directly with peers and supervisors. However, it should be noted that students in remote settings were encouraged to improve their communication as well, showing that good communication is important for all co-op students. This aligns with prior work (Baker et al., 2006; Raghuram et al., 2001) which found that strong communication was extremely important for remote employees.

Remote students were encouraged to be more innovative, perhaps showing that producing creative solutions is more important in a remote environment. Self-management and technological skills were also important in a remote context, which likely reflects the remote student's need to use technology to communicate with other team members as well as to complete work.

It is also important to consider the change in evaluation form when analyzing these logistic regression results. Terms such as *interperson* and *teamwork* were predictors of in-person recommendations, but these can be explained by changes in wording in the evaluation forms. Skills called interpersonal communication and teamwork were included in the 2019 form, while the wording was changed to remove the word interpersonal and use collaboration instead of teamwork in 2021.

Finally, it should be noted that a switch from in-person to remote work may not be the only explanation for these findings. Work has changed as a result of the COVID-19 pandemic beyond an increase in remote work. For example, employers' priorities have shifted, and they may now hire students for different kinds of work. These changes may also be reflected in these data and could also explain the discrepancies between the 2019 and 2021 evaluations.

## PRACTICAL IMPLICATIONS

By analyzing the evaluation criteria and supervisors' comments, this study discovered the most important skills for success in remote and in-person co-op positions. Furthermore, it was possible to learn which skills supervisors wanted students to improve. This information may be beneficial to students who wish to improve their job prospects, employers who aim to recruit the best talent, and institutions who may shift their educational policies accordingly. By understanding which skills are most valued in remote and in-person work, students can focus on acquiring skills that match the type of position they aim to fill. Employers may change their recruitment strategies to attract students with the most valuable skill sets. Institutions may offer additional workshops to improve highly valued soft skills such as communication. Strategies such as these can help co-op students to be more successful in the work-term positions.

For other researchers, these findings also have important implications. This study identified important skills for successful remote and in-person co-op students but did not determine the reasons why employers value these skills most highly. These findings could drive future studies involving direct interviews with employers to understand why highly valued skills may have changed with the switch to remote work. It would also be interesting to explore why oral communication and presentation skills were more valued for in-person positions. Furthermore, although these findings were specific to cooperative education in an undergraduate program, they may suggest similar trends for remote work in general. These findings could therefore be applicable to a wide range of researchers who are interested in employer satisfaction in modern work environments.

### *Recommendations*

From the findings of this paper, the following recommendations are made for students in cooperative education programs.

Students who plan to work remotely should focus on improving their work ethic and ability to work independently. Having a strategy for staying motivated and focusing on mastering technological skills including communication technologies will help students succeed in remote work.

Students who aim for in-person positions should ensure that they have excellent communication skills. Practicing presenting, speaking and writing clearly, and asking questions will be important for these students to ensure they interact effectively with their colleagues and supervisors.

Finally, students who fall short of receiving the highest evaluation ratings should focus on asking questions to ensure they fully understand their assigned tasks. Learning how to effectively manage workloads is also important to ensure work timeframes are met. If in a remote context, these students should aim to be more motivated and independent. In an in-person setting, they should instead focus on interacting positively and collaborating with colleagues and supervisors to achieve a rating of outstanding.

## CONCLUSION

This comparison of the employer evaluations of remote and in-person undergraduate co-op students has uncovered key factors that contribute to student success. The study included an analysis of written comments and recommendations from supervisors using logistic regression to determine which skills correlate most strongly with the overall performance rating. Through analysis of supervisor comments,

the most successful students were characterized by employers as being good leaders and innovators, with remote students also being praised for their independence. Finally, supervisors recommended that remote students become more innovative and learn technological skills while in-person students should improve their oral communication and presentation abilities. Ultimately, these important skills are valued by employers and should therefore be acquired by students in their early careers.

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## APPENDICES

APPENDIX A: Full tables including all the top 100 terms predicting outstanding and non-outstanding students after logistic regression analysis on supervisors' evaluation comments. Tables 1-4 correspond to Tables 2-5 in the main body of the article, where less interesting terms were removed for brevity.

TABLE 1: The top 100 terms predicting an outstanding student in 2021 evaluations of mostly remote positions, corresponding to Table 2 in the main body of the article.

Rank	Term	Weight	Original Text
1	outstand	+16.846	"outstanding", "outstandingly", "outstand", "outstandings"
2	went	+5.509	"went"
3	expect	+4.510	"expectations", "expected", "expectation", "expect", "expecting"
4	student	+4.030	"student", "students", "studentitis"
5	compani	+4.025	"company", "companies", "companied", "companys"
6	amaz	+3.911	"amazing", "amazed", "amazingly", "amaze", "amazes"
7	outstand perform	+3.606	"outstanding performance", "outstanding performer", "outstanding in her performance", "outstanding in his performance", "outstanding for her performance"
8	incred	+3.450	"incredible", "incredibly"
9	exceed	+3.349	"exceeded", "exceed", "exceeding", "exceeds", "exceedingly"
10	intern	+3.313	"intern", "internal", "interns", "international", "internally"
11	extrem	+3.306	"extremely", "extreme", "extremly", "extremally", "extremes"
12	year	+3.269	"year", "years", "yearly"
13	outstand job	+3.204	"outstanding job", "outstanding in this job", "outstand job", "outstand jobs", "outstanding in her job"
14	lead	+3.127	"leadership", "lead", "leading", "leads", "leadad"

15	level	+3.013	"level", "levels", "levelled", "leveling", "levelling"
	outstand		"outstanding rating", "outstanding ratings", "outstanding rate", "outstand
16	rate	+2.949	rating"
17	high	+2.946	"high", "highly", "highs"
18	gone	+2.922	"gone"
19	fulltim	+2.874	"fulltime", "fulltimer", "fulltimers", "fulltimes"
	perform		"performance was outstanding", "performance is outstanding",
20	outstand	+2.866	"performance has been outstanding", "performed outstanding",
			"performance as outstanding"
21	employe	+2.745	"employee", "employees", "employeeed"
22	rate	+2.726	"rating", "rate", "rated", "ratings", "rates"
23	product	+2.721	"product", "production", "productive", "products", "productivity"
24	entir	+2.691	"entire", "entirely", "entires", "entirity", "entirly"
25	deliv	+2.677	"deliver", "delivered", "delivering", "delivers", "delived"
26	everi	+2.673	"every"
27	problem	+2.670	"problem", "problems"
28	impress	+2.658	"impressed", "impressive", "impression", "impress", "impressively"
29	hire	+2.619	"hire", "hired", "hiring", "hires", "hirings"
30	took	+2.614	"took", "tooks"
	coop		"coop student", "coop students", "coops students", "coops student", "coop a
31	student	+2.572	student"
32	engin	+2.450	"engineering", "engineer", "engineers", "engine", "engines"
33	design	+2.413	"design", "designs", "designing", "designed", "designer"
34	mani	+2.387	"many"
35	critic	+2.381	"critical", "criticism", "critically", "criticisms", "criticize"
			"implementation", "implement", "implemented", "implementing",
36	implement	+2.321	"implementations"
37	huge	+2.315	"huge", "hugely"
38	goe	+2.307	"goes"
39	featur	+2.305	"features", "feature", "featured", "featuring", "featureful"
40	deserv	+2.302	"deserves", "deserving", "deserved", "deserve", "deservers"
41	impact	+2.289	"impact", "impactful", "impacted", "impacts", "impacting"
	outstand		"outstanding work", "outstanding to work", "outstanding in his work",
42	work	+2.284	"outstanding during his work", "outstanding working"
43	servic	+2.224	"service", "services", "servicing", "serviceability", "serviceable"
44	way	+2.223	"way", "ways"
45	custom	+2.175	"customer", "customers", "custom", "customizing", "customized"
46	provid	+2.123	"provided", "provide", "providing", "provides", "provider"
47	everyth	+2.104	"everything"
48	abil	+2.084	"ability", "abilities", "abillity", "abillities"
	exceed		"exceeded expectations", "exceeded our expectations", "exceeded my
49	expect	+2.073	expectations", "exceeded all expectations", "exceed expectations"
50	constant	+2.056	"constantly", "constant", "constants"
51	initi	+2.046	"initiative", "initial", "initiatives", "initially", "initiate"
52	innov	+2.034	"innovative", "innovation", "innovate", "innovations", "innovating"

53	solut	+2.030	"solutions", "solution", "solutioning", "solutation", "solved"
54	coop	+2.028	"coop", "coops"
55	signific	+2.009	"significant", "significantly", "significance"
56	multipl	+2.000	"multiple", "multiples", "multiplied", "multiplicative"
57	perfect	+1.998	"perfect", "perfectly", "perfection", "perfecting", "perfected"
58	dedic	+1.993	"dedication", "dedicated", "dedicate", "dedicating", "dedicates"
59	senior	+1.960	"senior", "seniors", "seniority", "seniorities"
60	comment	+1.942	"comments", "comment", "commented", "commenting", "commentable"
61	signific exceed	+1.937	"significantly exceeded", "significantly exceeding", "significantly exceed", "significantly exceeds"
62	tremend	+1.913	"tremendous", "tremendously", "tremendeous"
63	quick	+1.898	"quickly", "quick", "quickness"
64	expect coop	+1.887	"expectations for a coop", "expectations of a coop", "expected of a coop", "expected from a coop", "expect from a coop"
65	best coop	+1.883	"best coop", "best coops", "best of any of the coop"
66	best	+1.869	"best", "bested", "bests"
67	rare	+1.866	"rare", "rarely", "rares", "raring"
68	far	+1.852	"far"
69	outstand coop	+1.823	"outstanding coop", "outstanding coops", "outstanding during her coop", "outstanding for her coop", "outstanding in his coop"
70	new	+1.794	"new", "newness"
71	trust	+1.785	"trust", "trusted", "trusting", "trusts"
72	absolut	+1.780	"absolute", "absolutely", "absolutly", "absoluted"
73	organ	+1.771	"organization", "organized", "organizing", "organize", "organizations"
74	scope	+1.770	"scope", "scoping", "scoped", "scopes"
75	surpass	+1.751	"surpassed", "surpassing", "surpass", "surpasses"
76	alway	+1.745	"always", "alway", "alwayes"
77	code	+1.740	"code", "coding", "codes", "coded", "codeing"
78	alradi	+1.731	"already"
79	fantast	+1.716	"fantastic", "fantastically", "fantastics"
80	finish	+1.715	"finish", "finished", "finishing", "finishes", "finisheds"
81	say	+1.713	"say", "saying", "says"
82	love	+1.701	"love", "loved", "loves", "lovely", "loving"
83	amaz job	+1.687	"amazing job", "amazing jobs"
84	truli	+1.683	"truly"
85	highest	+1.683	"highest"
86	consist	+1.664	"consistently", "consistent", "consistency", "consistantly", "consisted"
87	cultur	+1.638	"culture", "cultural", "cultures", "culturally", "cultural"
88	project	+1.614	"project", "projects", "projecting", "projection", "projections"
89	day	+1.599	"day", "days"
90	offer	+1.590	"offer", "offered", "offering", "offers", "offerings"
91	qualiti	+1.564	"quality", "qualities"
92	independ	+1.554	"independently", "independent", "independence", "independantly", "independant"

93	taken	+1.547	"taken"
94	went expect	+1.537	"went above expectations", "went above our expectations", "went above what was expected", "went above my expectations", "went above all expectations"
95	major	+1.532	"major", "majority", "majoring", "majors"
96	model	+1.524	"model", "models", "modeling", "modelling", "modelled"
97	care	+1.503	"care", "carefully", "careful", "cares", "caring"
98	complex	+1.490	"complex", "complexity", "complexities", "complexed", "complexes"
99	fast	+1.485	"fast", "fastly", "fasted"
100	return	+1.480	"return", "returning", "returns", "returned", "returner"

TABLE 2: The top 100 terms predicting a non-outstanding student in 2021 evaluations of mostly remote positions, corresponding to Table 3 in the main body of the article.

Rank	Term	Weight	Original Text
1	overall	-4.162	"overall"
2	good	-4.126	"good", "goods", "goodly", "goodness"
3	term	-2.615	"term", "terms", "termly", "termed"
4	excel job	-2.520	"excellent job", "excellent jobs", "excelled at her job", "excellant job"
5	met	-2.317	"met"
6	work	-2.304	"work", "working", "worked", "works", "workings"
7	pleasur	-2.185	"pleasure", "pleasurable", "pleasuring", "pleasureable", "pleasureful"
8	remot	-1.980	"remote", "remotely"
9	thank	-1.940	"thank", "thanks", "thankful", "thanking", "thankfully"
10	work term	-1.934	"work term", "work terms", "work this term", "work with this term", "working with you this term"
11	howev	-1.892	"however"
12	encourag	-1.799	"encourage", "encouraged", "encouraging", "encouragement", "encourages"
13	perform excel	-1.793	"performance was excellent", "performance is excellent", "performed excellently", "performance has been excellent", "performed excellent"
14	<BIAS>	-1.763	
15	good job	-1.758	"good job", "good a job", "good jobs", "good at her job", "good at his job"
16	met expect	-1.695	"met expectations", "met all expectations", "met our expectations", "met the expectations", "met my expectations"
17	xd br	-1.694	"xd br", "xd same as above br", "xd and br", "xd so br", "xd these are br"
18	appreci	-1.666	"appreciated", "appreciate", "appreciation", "appreciative", "appreciates"
19	pleas	-1.642	"pleased", "please", "pleasing", "pleases"
20	progress	-1.596	"progress", "progressed", "progresses", "progression", "progressing"
21	unfortun	-1.551	"unfortunately", "unfortunate"
22	struggl	-1.381	"struggled", "struggle", "struggling", "struggles"
23	excel perform	-1.354	"excellent performance", "excellent performer", "excellent performance", "excellent she performed", "excel he perform"
24	delight	-1.342	"delighted", "delight", "delightful", "delights", "delightfully"



25	ask question	-1.333	"ask questions", "asking questions", "ask more questions", "asked questions", "asks questions"
26	great addit	-1.298	"great addition", "great additional", "great a addition", "great additions", "great but it s what she did in addition"
27	exceed perform	-1.296	"exceeded all performance", "exceeded performance", "exceeded some performance", "exceeded the performance", "exceeded our performance"
28	excel coop	-1.274	"excellent coop", "excel at this coop", "excelled in the coop", "excelled in this coop", "excellent during his coop"
29	quit	-1.256	"quite", "quit", "quitely", "quits", "quitting"
30	workterm	-1.241	"workterm", "workterms"
31	enjoy	-1.235	"enjoyed", "enjoy", "enjoys", "enjoyable", "enjoying"
32	best futur	-1.207	"best in her future", "best in his future", "best in your future", "best in the future", "best in future"
33	met exceed	-1.201	"met and exceeded", "met or exceeded", "met all and exceeded", "met but exceeded", "met exceeded"
34	friend	-1.120	"friendly", "friends", "friend"
35	great coop	-1.113	"great coop", "great during her coop", "greatly while on her coop", "great at the coop", "great but as a coop"
36	past month	-1.087	"past months", "past few months", "past month", "past few month", "past a few months"
37	task	-1.085	"tasks", "task", "tasked", "tasking", "taskings"
38	confid	-1.072	"confidence", "confident", "confidently", "confidant", "confidance"
39	assign time	-1.069	"assignments on time", "assigned to him in a timely", "assignments in a timely", "assigned to her in a timely", "assignment on time"
40	demonstr good	-1.043	"demonstrated good", "demonstrated a good", "demonstrated very good", "demonstrates good", "demonstrate good"
41	time manner	-1.037	"timely manner", "time manner", "timely manners", "time in the manner", "timing manner"
42	work home	-1.037	"working from home", "work from home", "worked from home", "working at home", "works from home"
43	overall pleas	-1.031	"overall i am very pleased", "overall we are very pleased", "overall we were very pleased", "overall very pleased", "overall i was very pleased"
44	comfort	-1.024	"comfortable", "comfort", "comfortably", "comfortability", "comforted"
45	email	-1.019	"email", "emails", "emailing", "emailed"
46	expos	-1.018	"exposed", "expose", "exposing", "exposes", "exposer"
47	workload	-1.011	"workload", "workloads"
48	meet expect	-1.008	"meet expectations", "meeting expectations", "meet the expectations", "meets expectations", "meet our expectations"
49	learn	-1.008	"learn", "learning", "learned", "learns", "learnings"
50	lack	-0.997	"lack", "lacking", "lacks", "lacked"
51	gain	-0.995	"gain", "gained", "gaining", "gains", "gained"
52	virtual	-0.992	"virtual", "virtually", "virtualization"
53	posit attitud	-0.987	"positive attitude", "positive attitudes", "positive can do attitude", "positive and can do attitude", "positive attitud"
54	second half	-0.982	"second half"
55	excel addit	-0.981	"excellent addition", "excellent in addition", "excellent additionally", "excellent additions", "excellent the additional"
56	offic	-0.973	"office", "offices", "officer", "officers", "offics"

57	demonstr strong	-0.970	"demonstrated strong", "demonstrated a strong", "demonstrates strong", "demonstrated very strong", "demonstrated a very strong"
58	half	-0.954	"half", "halfs"
59	remot work	-0.944	"remote work", "remote working", "remotely working", "remotely for this work", "remote from work"
60	great	-0.937	"great", "greatly", "greatness", "greatful", "greate"
61	andrew	-0.936	"andrew", "andrews"
62	complet task	-0.926	"complete tasks", "completing tasks", "completed tasks", "complete the tasks", "completed all tasks"
63	bit	-0.923	"bit", "bits"
64	hard worker	-0.922	"hard worker", "hard of a worker"
65	varieti	-0.914	"variety", "varieties"
66	kevin	-0.911	"kevin"
67	desir	-0.901	"desire", "desired", "desires", "desirable", "desiring"
68	condit	-0.899	"conditions", "condition", "conditioning", "conditional"
69	midterm	-0.897	"midterm", "midterms"
70	work deliv	-0.882	"work delivered", "work he delivered", "work and delivered", "work she delivered", "work and delivering"
71	improv	-0.879	"improve", "improvement", "improved", "improving", "improvements"
72	john	-0.860	"john", "johns"
73	valu member	-0.850	"valued member", "value for members", "valued by all members"
74	work abl	-0.842	"work and was able", "work she was able", "work he was able", "work and is able", "work she is able"
75	coop term	-0.841	"coop term", "coop terms", "coop this term", "coops this term", "coops term"
76	nice	-0.838	"nice", "nicely"
77	improv term	-0.819	"improved over the term", "improvement over the term", "improvement in terms", "improved as the term", "improvement this term"
78	good perform	-0.819	"good performance", "good performer", "good at performing", "good he performed", "good her performance"
79	given work	-0.813	"given work", "given the work", "given and worked", "given her work", "given his work"
80	jason	-0.811	"jason", "jasons"
81	term abl	-0.811	"term he was able", "term she was able", "term and was able", "term he is able", "term we were able"
82	ask help	-0.806	"ask for help", "asking for help", "asked for help", "asks for help", "asked to help"
83	display great	-0.802	"displayed great", "displayed a great", "displays a great", "displaying great", "display great"
84	thank hard	-0.792	"thank you for all your hard", "thank you for your hard", "thanks for all your hard", "thank you for all of your hard", "thanks for all of your hard"
85	forward futur	-0.792	"forward to future", "forward to his future", "forward for future", "forward in future", "forward in your future"
86	grow	-0.788	"grow", "growing", "grows", "grew"
87	cours term	-0.783	"course of the term", "course of his term", "course of her term", "course of this term", "course this term"
88	abl make	-0.782	"able to make", "able make", "able to makes", "able to making", "able to only make"

89	daniel	-0.778	"daniel", "daniell", "daniels", "daniele"
90	lot potenti	-0.776	"lot of potential", "lots of potential", "lot of potentials", "lot potential", "lots of potentials"
91	excel	-0.765	"excellent", "excel", "excelled", "excellence", "excels"
92	excel exceed	-0.759	"excellent and exceeded", "excellent and he has exceeded", "excellent exceeding", "excellent and exceeds", "excel and exceeded"
93	excel term	-0.756	"excellent term", "excelled this term", "excellent this term", "excelled at this term", "excelled in this term"
94	engag	-0.755	"engaged", "engagement", "engage", "engaging", "engagements"
95	follow instruct	-0.748	"follow instructions", "followed instructions", "follows instructions", "following instructions", "follow the instructions"
96	need improv	-0.748	"needs to improve", "need to improve", "needs improvement", "need improvement", "needed to improve"
97	perform task	-0.735	"perform tasks", "performing tasks", "perform the tasks", "performed all tasks", "performed tasks"
98	great asset	-0.732	"great asset", "great assets", "great and an asset", "great an asset", "great she was an asset"
99	wish best	-0.731	"wish her all the best", "wish him all the best", "wish you all the best", "wish her the best", "wish him the best"
100	manag workload	-0.723	"manage her workload", "manage his workload", "managed her workload", "manage workload", "manage workloads"

TABLE 3: The top 100 terms predicting an outstanding student in 2019 evaluations of mostly in-person positions, corresponding to Table 4 in the main body of the article.

Rank	Term	Weight	Original Text
1	outstand	+17.581	"outstanding", "outstandingly", "outstand", "outstandings"
2	went	+5.133	"went"
3	expect	+4.489	"expectations", "expected", "expectation", "expect", "expecting"
4	exceed	+4.123	"exceeded", "exceed", "exceeding", "exceeds", "exceedingly"
5	extrem	+4.030	"extremely", "extreme", "extremly", "extremally", "extremes"
6	fulltim	+3.958	"fulltime", "fulltimer", "fulltimers", "fulltimes"
7	amaz	+3.622	"amazing", "amazed", "amazingly", "amaze", "amazes"
8	level	+3.592	"level", "levels", "levelled", "leveling", "levelling"
9	comment	+3.448	"comments", "comment", "commented", "commenting", "commentable"
10	outstand perform	+3.434	"outstanding performance", "outstanding performer", "outstanding in her performance", "outstanding in his performance", "outstanding for her performance"
11	exceed expect	+3.425	"exceeded expectations", "exceeded our expectations", "exceeded my expectations", "exceeded all expectations", "exceed expectations"
12	gone	+3.405	"gone"
13	compani	+3.398	"company", "companies", "companied", "company's"
14	hire	+3.287	"hire", "hired", "hiring", "hires", "hirings"
15	lead	+3.236	"leadership", "lead", "leading", "leads", "leaded"
16	outstand rate	+3.233	"outstanding rating", "outstanding ratings", "outstanding rate", "outstand rating"

17	outstand job	+3.213	"outstanding job", "outstanding in this job", "outstand job", "outstand jobs", "outstanding in her job"
18	high	+3.050	"high", "highly", "highs"
19	intern	+3.036	"intern", "internal", "interns", "international", "internally"
20	everi	+2.942	"every"
21	rate	+2.804	"rating", "rate", "rated", "ratings", "rates"
22	deserv	+2.781	"deserves", "deserving", "deserved", "deserve", "deservers"
23	coop student	+2.747	"coop student", "coop students", "coops students", "coops student", "coop a student"
24	outstand work	+2.719	"outstanding work", "outstanding to work", "outstanding in his work", "outstanding during his work", "outstanding working"
25	engin	+2.643	"engineering", "engineer", "engineers", "engine", "engines"
26	perform outstand	+2.534	"performance was outstanding", "performance is outstanding", "performance has been outstanding", "performed outstanding", "performance as outstanding"
27	year	+2.532	"year", "years", "yearly"
28	employe	+2.526	"employee", "employees", "employeeed"
29	best	+2.490	"best", "bested", "bests"
30	truli	+2.485	"truly"
31	solut	+2.450	"solutions", "solution", "solutioning", "solutation", "solutioned"
32	incred	+2.423	"incredible", "incredibly"
33	idea	+2.368	"ideas", "idea"
34	tremend	+2.336	"tremendous", "tremendously", "tremendeous"
35	graduat	+2.316	"graduate", "graduation", "graduates", "graduated", "graduating"
36	impress	+2.304	"impressed", "impressive", "impression", "impress", "impressively"
37	took	+2.266	"took", "tooks"
38	complex	+2.265	"complex", "complexity", "complexities", "complexed", "complexes"
39	student	+2.211	"student", "students", "studentitis"
40	design	+2.200	"design", "designs", "designing", "designed", "designer"
41	fantast	+2.189	"fantastic", "fantastically", "fantastics"
42	realli	+2.168	"really"
43	critic	+2.167	"critical", "criticism", "critically", "criticisms", "criticize"
44	coop	+2.165	"coop", "coops"
45	everyth	+2.150	"everything"
46	entir	+2.136	"entire", "entirely", "entires", "entirity", "entirly"
47	far	+2.135	"far"
48	perfect	+2.133	"perfect", "perfectly", "perfection", "perfecting", "perfected"
49	respons	+2.130	"responsibilities", "responsibility", "responsible", "responsive", "response"
50	impact	+2.121	"impact", "impactful", "impacted", "impacts", "impacting"
51	love	+2.119	"love", "loved", "loves", "lovely", "loving"
52	miss	+2.112	"missed", "miss", "missing", "misses"
53	alreadi	+2.059	"already"
54	deliv	+2.049	"deliver", "delivered", "delivering", "delivers", "delived"
55	innov	+2.039	"innovative", "innovation", "innovate", "innovations", "innovating"

56	consist	+2.026	"consistently", "consistent", "consistency", "consistently", "consisted"
57	super	+2.026	"super"
58	signific	+2.024	"significant", "significantly", "significance"
59	hope	+2.006	"hope", "hopefully", "hoping", "hoped", "hopes"
60	abil	+2.001	"ability", "abilities", "abillity", "abillities"
61	lucky	+2.000	"lucky"
62	insight	+1.975	"insights", "insight", "insightful", "insightfulness"
63	develop	+1.929	"development", "develop", "developing", "developed", "developer"
64	way	+1.928	"way", "ways"
65	implement	+1.926	"implementation", "implement", "implemented", "implementing", "implementations"
66	product	+1.925	"product", "production", "productive", "products", "productivity"
67	problem	+1.922	"problem", "problems"
68	invalu	+1.919	"invaluable"
69	surpass	+1.915	"surpassed", "surpassing", "surpass", "surpasses"
70	execut	+1.908	"execute", "execution", "executing", "executed", "executive"
71	everi task	+1.901	"every task", "every tasks"
72	oustand	+1.888	"outstanding"
73	alway	+1.860	"always", "alway", "alwayes"
74	demonstr oustand	+1.856	"demonstrated outstanding", "demonstrated an outstanding", "demonstrates an outstanding", "demonstrated his outstanding", "demonstrating an outstanding"
75	come	+1.855	"come", "comes", "coming", "comings"
76	second	+1.854	"second", "secondly", "seconds", "seconded", "secondement"
77	talent	+1.850	"talented", "talent", "talents"
78	contribut	+1.838	"contributions", "contributed", "contribute", "contribution", "contributing"
79	offer	+1.836	"offer", "offered", "offering", "offers", "offerings"
80	featur	+1.835	"features", "feature", "featured", "featuring", "featureful"
81	result	+1.834	"results", "result", "resulted", "resulting", "resultant"
82	mani	+1.832	"many"
83	rare	+1.827	"rare", "rarely", "rares", "raring"
84	research	+1.805	"research", "researching", "researched", "researcher", "researchers"
85	senior	+1.801	"senior", "seniors", "seniority", "seniorities"
86	comment submit	+1.795	"comments submitted"
87	absolut	+1.781	"absolute", "absolutely", "absolutly", "absoluted"
88	project	+1.768	"project", "projects", "projecting", "projection", "projections"
89	dedic	+1.767	"dedication", "dedicated", "dedicate", "dedicating", "dedicates"
90	highest	+1.765	"highest"
91	pleas comment	+1.735	"please comment"
92	exemplari	+1.728	"exemplary"
93	step	+1.725	"step", "steps", "stepped", "stepping"

94	went expect		"went above expectations", "went above our expectations", "went above what was expected", "went above my expectations", "went above all expectations"
		+1.722	
95	make	+1.722	"make", "making", "makes", "makings", "maked"
96	challeng	+1.719	"challenges", "challenging", "challenge", "challenged", "challenger"
97	code	+1.711	"code", "coding", "codes", "coded", "codeing"
98	short	+1.700	"short", "shortly", "shorting", "shorts", "shorted"
99	built	+17.581	"built", "builts", "building"
100	surpass expect		"surpassed expectations", "surpassed our expectations", "surpassed my expectations", "surpassed the expectations", "surpassed all expectations"
		+5.133	

TABLE 4: The top 100 terms predicting a non-outstanding student in 2019 evaluations of mostly in-person positions, corresponding to Table 5 in the main body of the article.

Rank	Term	Weight	Original Text
1	good	-4.311	"good", "goods", "goodly", "goodness"
2	overall	-2.428	"overall"
3	term	-2.195	"term", "terms", "termly", "termed"
4	work	-2.148	"work", "working", "worked", "works", "workings"
5	howev	-2.144	"however"
6	met expect	-2.138	"met expectations", "met all expectations", "met our expectations", "met the expectations", "met my expectations"
7	good job	-2.131	"good job", "good a job", "good jobs", "good at her job", "good at his job"
8	<BIAS>	-2.006	
9	met	-1.999	"met"
10	task	-1.860	"tasks", "task", "tasked", "tasking", "taskings"
11	appreci	-1.775	"appreciated", "appreciate", "appreciation", "appreciative", "appreciates"
12	excel perform	-1.669	"excellent performance", "excellent performer", "excellent performance", "excellent she performed", "excel he perform"
13	xd br	-1.658	"xd br", "xd same as above br", "xd and br", "xd so br", "xd these are br"
14	ask question	-1.642	"ask questions", "asking questions", "ask more questions", "asked questions", "asks questions"
15	general	-1.513	"general", "generally", "generalize", "generalized", "generalization"
16	lack	-1.506	"lack", "lacking", "lacks", "lacked"
17	meet expect	-1.440	"meet expectations", "meeting expectations", "meet the expectations", "meets expectations", "meet our expectations"
18	work term	-1.435	"work term", "work terms", "work this term", "work with this term", "working with you this term"
19	updat	-1.422	"updates", "update", "updating", "updated", "updater"
20	complet assign	-1.399	"complete assigned", "complete the assigned", "completed all assigned", "completing assigned", "completed assigned"
21	demonstr good	-1.397	"demonstrated good", "demonstrated a good", "demonstrated very good", "demonstrates good", "demonstrate good"
22	feedback	-1.389	"feedback", "feedbacks"
23	excel job	-1.379	"excellent job", "excellent job", "excellent jobs", "excelled at her job", "excellant job"

24	quiet	-1.377	"quiet", "quietly", "quietness"
25	great addit	-1.377	"great addition", "great additional", "great a addition", "great additions", "great but it s what she did in addition"
26	encourag	-1.372	"encourage", "encouraged", "encouraging", "encouragement", "encourages"
27	quit	-1.329	"quite", "quit", "quitely", "quits", "quitting"
28	pleasur	-1.323	"pleasure", "pleasurable", "pleasuring", "pleasureable", "pleasureful"
29	work good	-1.287	"work was very good", "work and good", "work good", "work was good", "work with a good"
30	thank	-1.277	"thank", "thanks", "thankful", "thanking", "thankfully"
31	excel coop	-1.260	"excellent coop", "excel at this coop", "excelled in the coop", "excelled in this coop", "excellent during his coop"
32	wish best	-1.222	"wish her all the best", "wish him all the best", "wish you all the best", "wish her the best", "wish him the best"
33	sometim	-1.210	"sometimes", "sometime"
34	gain	-1.209	"gain", "gained", "gaining", "gains", "gained"
35	good perform	-1.181	"good performance", "good performer", "good at performing", "good he performed", "good her performance"
36	wish	-1.176	"wish", "wishes", "wishing", "wished"
37	struggl	-1.163	"struggled", "struggle", "struggling", "struggles"
38	perform excel	-1.146	"performance was excellent", "performance is excellent", "performed excellently", "performance has been excellent", "performed excellent"
39	friend	-1.138	"friendly", "friends", "friend"
40	slow	-1.136	"slow", "slowing", "slowed", "slows", "slowness"
41	expos	-1.113	"exposed", "expose", "exposing", "exposes", "exposer"
42	assign task	-1.095	"assigned tasks", "assigned task", "assigned a task", "assignments and tasks", "assign tasks"
43	perform good	-1.067	"performance was very good", "performance was good", "performance has been very good", "performance is good", "performance is very good"
44	bit	-1.063	"bit", "bits"
45	coop term	-1.060	"coop term", "coop terms", "coop this term", "coops this term", "coops term"
46	xd overall	-1.058	"xd overall", "xd his overall", "xd her overall", "xd the overall", "xd an overall"
47	addit team	-1.057	"addition to our team", "addition to the team", "addition to any team", "addition to my team", "addition to a team"
48	new task	-1.006	"new tasks", "new task", "new he was tasked", "new to a task"
49	pleasant	-0.979	"pleasant", "pleasantly"
50	assign	-0.973	"assigned", "assignments", "assignment", "assign", "assigning"
51	good term	-0.966	"good term", "good in terms", "good this term", "good and as the term", "good during the term"
52	xd area	-0.965	"xd areas", "xd an area", "xd the only area", "xd for areas", "xd some areas"
53	instruct	-0.959	"instructions", "instruction", "instructional", "instructed", "instructing"
54	feedback receiv	-0.954	"feedback received", "feedback he received", "feedback she received", "feedback i received", "feedback she receives"
55	improv	-0.950	"improve", "improvement", "improved", "improving", "improvements"
56	ticket	-0.946	"tickets", "ticket", "ticketing", "ticketed"

57	comfort	-0.946	"comfortable", "comfort", "comfortably", "comfortability", "comforted"
58	file	-0.940	"files", "file", "filing", "filed", "filings"
59	varieti	-0.936	"variety", "varieties"
60	jack	-0.933	"jack", "jacks"
61	meet	-0.918	"meetings", "meet", "meeting", "meets"
62	error	-0.917	"errors", "error"
63	area improv	-0.916	"areas of improvement", "areas for improvement", "area of improvement", "area for improvement", "areas to improve"
64	receiv	-0.910	"received", "receiving", "receive", "receives", "receivable"
65	understand task	-0.906	"understand the task", "understand the tasks", "understanding of the task", "understanding of the tasks", "understand tasks"
66	engag	-0.901	"engaged", "engagement", "engage", "engaging", "engagements"
67	met exceed	-0.899	"met and exceeded", "met or exceeded", "met all and exceeded", "met but exceeded", "met exceeded"
68	excel addit	-0.884	"excellent addition", "excellent in addition", "excellent additionally", "excellent additions", "excellent the additional"
69	various task	-0.879	"various tasks", "various other tasks", "various task"
70	semest	-0.871	"semester", "semesters"
71	br xd	-0.866	"br xd"
72	unfortun	-0.863	"unfortunately", "unfortunate"
73	fair	-0.861	"fairly", "fair", "faire", "fairness", "fairs"
74	br	-0.857	"br"
75	construct	-0.854	"constructive", "construction", "constructively", "constructed", "constructing"
76	confid	-0.843	"confidence", "confident", "confidently", "confidant", "confidance"
77	valuabl addit	-0.838	"valuable addition", "valuable additions"
78	eric	-0.834	"eric"
79	clarif	-0.834	"clarification", "clarifications"
80	time manner	-0.832	"timely manner", "time manner", "timely manners", "time in the manner", "timing manner"
81	xd	-0.824	"xd"
82	team	-0.824	"team", "teams", "teaming", "teamed"
83	demonstr willing	-0.806	"demonstrated a willingness", "demonstrated willingness", "demonstrated his willingness", "demonstrates a willingness", "demonstrated the willingness"
84	great job	-0.804	"great job", "great jobs", "great a job", "great at his job", "great in any job"
85	team summer	-0.800	"team this summer", "team for the summer", "team over the summer", "team during the summer", "team during his summer"
86	futur career	-0.798	"future career", "future careers", "futur career", "future and career", "future in her career"
87	work independ	-0.798	"work independently", "worked independently", "working independently", "works independently", "worked very independently"
88	divers	-0.798	"diverse", "diversity", "diversed", "diversely", "diversities"
89	observ	-0.790	"observed", "observe", "observations", "observation", "observing"
90	welcom addit	-0.785	"welcome addition", "welcomed addition", "welcome additional", "welcomed additional", "welcoming addition"



91	great coop	-0.782	"great coop", "great during her coop", "greatly while on her coop", "great at the coop", "great but as a coop"
92	team month	-0.775	"team for months", "team in the months", "team months", "team over her month", "team during her month"
93	assist	-0.774	"assist", "assistance", "assisted", "assistant", "assisting"
94	strength	-0.773	"strengths", "strength"
95	especi	-0.771	"especially"
96	daniel	-0.770	"daniel", "daniell", "daniels", "daniele"
97	inform	-0.765	"information", "informed", "inform", "informative", "informal"
98	focus	-0.761	"focus", "focused", "focusing", "focuses", "focuse"
99	nice	-0.760	"nice", "nicely"
100	luck futur	-0.756	"luck in the future", "luck in your future", "luck in her future", "luck in his future", "luck with your future"

APPENDIX B: Full tables including all the top 100 terms predicting remote and in-person students after logistic regression analysis on supervisors' recommendation comments. Tables 5-6 correspond to Tables 7-8 in the main body of the article, where less interesting terms were removed for brevity.

TABLE 5: The top 100 terms predicting a remote student (2021) from the supervisors' recommendation comments, corresponding to Table 7 in the main body of the article.

Rank	Term	Weight	Original Text
1	nt	+8.232	"nt"
2	collabor	+4.979	"collaboration", "collaborative", "collaborate", "collaborated", "collaborating"
3	innov	+4.663	"innovative", "innovation", "innovate", "innovations", "innovating"
4	remot	+4.060	"remote", "remotely"
5	mention	+3.888	"mentioned", "mention", "mentioning", "mentionned", "mentions"
6	critic think	+3.829	"critical thinking", "critically think", "critically thinking", "critical think", "critical thinkings"
7	area develop	+3.464	"areas for development", "areas of development", "area of development", "area for development", "areas to develop"
8	mindset	+3.391	"mindset", "mindsets"
9	critic	+3.293	"critical", "criticism", "critically", "criticisms", "criticize"
10	covid	+3.072	"covid", "covidence"
11	comment	+2.741	"comments", "comment", "commented", "commenting", "commentable"
12	selfmanag	+2.664	"selfmanagement", "selfmanage", "selfmanaged", "selfmanaging", "selfmanageable"
13	virtual	+2.551	"virtual", "virtually", "virtualization"
14	technolog	+2.432	"technologies", "technology", "technological", "technologically", "technolog"
15	nt afraid	+2.385	"nt be afraid", "nt afraid"
16	learn	+2.353	"learn", "learning", "learned", "learns", "learnings"
17	curios	+2.311	"curiosity", "curiosities"
18	workplac	+2.241	"workplace", "workplaces", "workplacements"
19	section	+2.151	"section", "sections"

20	curious	+2.134	"curious", "curiosity", "curiouse", "curiousness", "curiosities"
21	selfassess	+2.114	"selfassessment", "selfassess", "selfassessments", "selfassessed", "selfassessing"
22	technic skill	+2.112	"technical skills", "technical skill", "technically skilled", "technical and other skills", "technical and skill"
23	think	+2.057	"think", "thinking", "thinks", "thinkings"
24	implement	+2.052	"implementation", "implement", "implemented", "implementing", "implementations"
25	remot work	+2.003	"remote work", "remote working", "remotely working", "remotely for this work", "remote from work"
26	hope	+1.924	"hope", "hopefully", "hoping", "hoped", "hopes"
27	disciplin	+1.888	"discipline", "disciplines", "disciplined"
28	reach	+1.877	"reach", "reaching", "reached", "reaches"
29	support	+1.870	"support", "supporting", "supported", "supportive", "supports"
30	comment includ	+1.858	"comments not included", "comments included", "comments include", "comments and including", "comments i ll include"
31	innov mindset	+1.849	"innovation mindset", "innovative mindset", "innovative mindsets", "innovate mindset", "innovating mindset"
32	career	+1.847	"career", "careers"
33	data	+1.835	"data", "datas"
34	career develop	+1.830	"career development", "career develops", "career and development", "career as a developer", "career develop"
35	work remot	+1.655	"working remotely", "work remotely", "worked remotely", "working remote", "working in a remote"
36	communic	+1.647	"communication", "communicate", "communicating", "communications", "communicated"
37	area	+1.640	"areas", "area"
38	develop area	+1.601	"development areas", "development area", "develop in this area", "develop in the areas", "development in this area"
39	pandem	+1.581	"pandemic"
40	lifelong	+1.571	"lifelong"
41	agil	+1.557	"agile", "agility"
42	opportun	+1.525	"opportunities", "opportunity", "opportune"
43	cover	+1.490	"cover", "covered", "covering", "covers"
44	world	+1.481	"world", "worlds", "worldly"
45	want	+1.428	"want", "wants", "wanted", "wanting"
46	previous	+1.377	"previous", "previously"
47	good communic	+1.376	"good communication", "good communicator", "good at communicating", "good at communication", "good communications"
48	think critic	+1.371	"think critically", "thinking critically", "thinks critically", "think more critically", "think about critical"
49	learn opportun	+1.369	"learning opportunities", "learning opportunity", "learn from all opportunities", "learn from the opportunities", "learn from them they are opportunities"
50	skillset	+1.360	"skillset", "skillsets", "skillsetabilities"
51	self manag	+1.332	"self management", "self manage", "self managed", "self managing", "self manages"

52	opportun learn	+1.322	"opportunities to learn", "opportunity to learn", "opportunities for learning", "opportunities and learning", "opportunity for learning"
53	make suggest	+1.313	"make suggestions", "making suggestions", "make more suggestions", "make a suggestion", "make some suggestions"
54	ethan	+1.286	"ethan", "ethans"
55	work area	+1.275	"work area", "work in this area", "work on areas", "working on the areas", "work in areas"
56	onlin	+1.268	"online", "onlined"
57	develop	+1.260	"development", "develop", "developing", "developed", "developer"
58	question	+1.230	"questions", "question", "questioning", "questioned", "questionable"
59	mani	+1.229	"many"
60	skill experi	+1.225	"skills and experience", "skills and experiences", "skills through experience", "skills with experience", "skills with more experience"
61	relev	+1.224	"relevant", "relevance", "relevent", "relevancy", "releve"
62	strength	+1.212	"strengths", "strength"
63	futur internship	+1.211	"future internships", "future internship", "future during her internship", "future over the internship"
64	anoth work	+1.195	"another work", "another for work", "another she worked", "another the work", "another your work"
65	pleasur	+1.189	"pleasure", "pleasurable", "pleasuring", "pleasureable", "pleasureful"
66	love	+1.187	"love", "loved", "loves", "lovely", "loving"
67	hire	+1.175	"hire", "hired", "hiring", "hires", "hirings"
68	collabor communic	+1.166	"collaboration and communication", "collaborate and communicate", "collaboration communication", "collaborated and communicated", "collaborating and communicating"
69	cpa	+1.166	"cpa"
70	train	+1.161	"training", "train", "trained", "trainings", "trains"
71	communic collabor	+1.160	"communication and collaboration", "communication collaboration", "communicate and collaborate", "communicating and collaborating", "communicator and collaborator"
72	inform	+1.155	"information", "informed", "inform", "informative", "informal"
73	journey	+1.152	"journey", "journeys"
74	spring	+1.147	"spring"
75	necessari	+1.137	"necessary"
76	literaci	+1.137	"literacy"
77	pleas	+1.133	"pleased", "please", "pleasing", "pleases"
78	academ	+1.130	"academic", "academics", "academically", "academe", "academical"
79	contin increas	+1.127	"continue to increase", "continue increasing", "continued to increase", "continues to increase", "continually increase"
80	overcom	+1.126	"overcome", "overcoming", "overcomes", "overcomed", "overcomming"
81	collabor skill	+1.125	"collaboration skills", "collaborative skills", "collaboration skill", "collaborative skill", "collaborating skills"
82	state	+1.123	"state", "stated", "states", "stating", "stateful"
83	effect	+1.118	"effectively", "effective", "effectiveness", "effect", "effects"
84	contin posit	+1.117	"continue her positive", "continue the positive", "continue to be a positive", "continually had a positive", "continue his positive"

85	confid speak	+1.116	"confidence to speak", "confidence when speaking", "confidence in speaking", "confident to speak", "confident when speaking"
86	honest	+1.113	"honest", "honestly"
87	planner	+1.113	"planner", "planners"
88	work home	+1.107	"working from home", "work from home", "worked from home", "working at home", "works from home"
89	note	+1.102	"notes", "noted", "note", "noting"
90	glad	+1.099	"glad", "gladly", "gladfully"
91	skill develop	+1.095	"skill development", "skills development", "skills developed", "skills to develop", "skill to develop"
92	technolog skill	+1.094	"technological skills", "technology skills", "technologies and skills", "technology skill", "technological skill"
93	encourag think	+1.088	"encouraged to think", "encourage him to think", "encourage you to think", "encourage her to think", "encourage him to do so i think"
94	believ	+1.086	"believe", "believes", "believed", "believing", "believer"
95	develop quot	+1.080	"development quot", "developer quot", "develop a quot", "develop her quot", "develop quot"
96	develop section	+1.080	"development section", "develop our section", "develop section", "development section", "development sections"
97	improv busi	+1.078	"improve business", "improving the business", "improve the business", "improve her business", "improve both the business"
98	demonstr strong	+1.077	"demonstrated strong", "demonstrated a strong", "demonstrates strong", "demonstrated very strong", "demonstrated a very strong"
99	strong	+1.073	"strong", "strongly", "stronge"
100	lifelong learn	+1.071	"lifelong learning"

TABLE 6: The top 100 terms predicting an in-person student (2019) from the supervisors' recommendation comments, corresponding to Table 8 in the main body of the article.

Rank	Term	Weight	Original Text
1	written	-2.795	"written"
2	interperson	-2.671	"interpersonal", "interpersonally", "interperson"
3	quot	-2.592	"quot", "quotes", "quote", "quoting"
4	public speak	-2.246	"public speaking"
5	present	-2.118	"presentation", "presented", "present", "presentations", "presenting"
6	entrepreneuri	-2.064	"entrepreneurial", "entrepreneurialism", "entrepreneurially"
7	interperson communic	-1.931	"interpersonal communication", "interpersonal and communication", "interpersonal communications", "interpersonal and communications"
8	depend	-1.926	"dependable", "dependability", "depend", "depending", "dependencies"
9	proactiv	-1.868	"proactive", "proactively", "proactiveness", "proactivity", "proactivelys"
10	oral	-1.830	"oral", "orally", "orall"
11	assert	-1.827	"assertive", "assertiveness", "assert", "asserting", "assertively"
12	sometim	-1.803	"sometimes", "sometime"
13	ensur	-1.788	"ensure", "ensuring", "ensured", "ensures"
14	quiet	-1.749	"quiet", "quietly", "quietness"

15	problem solv	-1.725	"problem solving", "problem solve", "problems to solve", "problem solved", "problem to solve"
16	teamwork	-1.723	"teamwork", "teamworker", "teamworking", "teamworks"
17	public	-1.715	"public", "publication", "publications", "publicly", "publically"
18	oral communic	-1.701	"oral communication", "oral communications", "oral communicator", "oral and communication", "oral the communication"
19	issu	-1.683	"issues", "issue", "issuing", "issued"
20	speak	-1.661	"speaking", "speak", "speaks", "speaking"
21	punctual	-1.650	"punctual", "punctuality", "punctually", "punctuality"
22	request	-1.615	"requests", "requested", "request", "requesting", "requester"
23	interact	-1.562	"interactions", "interact", "interaction", "interacted", "interacting"
24	audienc	-1.555	"audience", "audiences"
25	enthusiasm	-1.532	"enthusiasm", "enthusiasms"
26	work abil	-1.504	"work and ability", "working ability", "work ability", "work and his ability", "work and her ability"
27	independ	-1.504	"independently", "independent", "independence", "independantly", "independant"
28	order	-1.494	"order", "orders", "ordering", "orderly", "ordered"
29	attent	-1.476	"attention", "attentive", "attentively", "attentiveness", "attentions"
30	peopl	-1.381	"people", "peoples"
31	resolv	-1.364	"resolve", "resolved", "resolving", "resolves", "resolver"
32	littl	-1.338	"little"
33	solv skill	-1.337	"solving skills", "solving skill", "solveing skills", "solving these are skills"
34	qualiti	-1.324	"quality", "qualities"
35	document	-1.314	"documentation", "documents", "document", "documented", "documenting"
36	approach	-1.295	"approach", "approaches", "approached", "approachable", "approaching"
37	discuss person	-1.295	"discussed in person", "discuss personal", "discuss with other persons", "discussed personally", "discussed these in person"
38	offic	-1.287	"office", "offices", "officer", "officers", "offics"
39	career softwar	-1.278	"career in software", "career as a software", "career in the software", "career as software"
40	matur	-1.277	"maturity", "mature", "matures", "matured", "maturely"
41	languag	-1.269	"language", "languages"
42	problemsolv	-1.268	"problemsolving", "problemsolve", "problemsolver", "problemsolved"
43	construct critic	-1.243	"constructive criticism", "constructive criticisms", "construction criticism"
44	br xd	-1.239	"br xd"
45	given	-1.239	"given"
46	manner	-1.226	"manner", "mannered", "manners", "mannerism", "mannerly"
47	lead	-1.221	"leadership", "lead", "leading", "leads", "lead"
48	br	-1.214	"br"
49	enhanc	-1.190	"enhance", "enhanced", "enhancing", "enhancements", "enhancement"
50	creativ	-1.189	"creative", "creativity", "creatively", "creativeness", "creativities"
51	someth	-1.187	"something"

52	improv written	-1.186	"improve his written", "improving written", "improve written", "improving his written", "improve her written"
53	watch	-1.184	"watch", "watching", "watched", "watches", "watchful"
54	easili	-1.170	"easily"
55	need work	-1.168	"needs to work", "need to work", "needed to work", "needs more work", "needs work"
56	challeng face	-1.167	"challenges faced", "challenges he faced", "challenges she faced", "challenges we faced", "challenges facing"
57	fulli	-1.165	"fully"
58	error	-1.160	"errors", "error"
59	test	-1.152	"testing", "test", "tests", "tested", "testings"
60	pursu	-1.152	"pursue", "pursuing", "pursues", "pursued", "pursueing"
61	judgement	-1.150	"judgement", "judgements"
62	encourag continu	-1.148	"encouraged to continue", "encourage her to continue", "encourage him to continue", "encourage you to continue", "encourage to continue"
63	client	-1.143	"client", "clients"
64	attempt	-1.136	"attempt", "attempting", "attempts", "attempted"
65	xd ask	-1.130	"xd ask", "xd asking", "xd asked", "xd asks", "xd i asked"
66	listen	-1.130	"listening", "listen", "listens", "listener", "listened"
67	work tri	-1.130	"work and try", "work try", "work to try", "working on trying", "work and tried"
68	intuit	-1.129	"intuition", "intuitive", "intuit", "intuitively", "intuitions"
69	activ listen	-1.126	"active listening", "active listener", "actively listening", "actively listens", "actively listened"
70	consist	-1.122	"consistently", "consistent", "consistency", "consistently", "consisted"
71	verbal	-1.116	"verbal", "verbally", "verbalize", "verbalized", "verbalizing"
72	object	-1.113	"objectives", "objective", "object", "objects", "objectively"
73	successful	-1.111	"successfull"
74	care	-1.096	"care", "carefully", "careful", "cares", "caring"
75	communic skill	-1.093	"communication skills", "communications skills", "communication skill", "communicative skills", "communications skill"
76	grow profession	-1.084	"grow professionally", "grow as a professional", "grow her professional", "grow his professional", "growing professionally"
77	consult	-1.078	"consulting", "consultant", "consultants", "consult", "consultation"
78	opportun demonstr	-1.078	"opportunities to demonstrate", "opportunity to demonstrate", "opportunities that she has demonstrated", "opportunity for you to demonstrate", "opportunities and demonstrated"
79	social	-1.072	"social", "socially", "socialize", "socializing", "socials"
80	xd	-1.072	"xd"
81	becam	-1.067	"became"
82	quick	-1.065	"quickly", "quick", "quickness"
83	mark	-1.063	"marking", "mark", "marked", "marks", "markedly"
84	persu	-1.062	"persue", "persuing", "persued", "persues"
85	ergonom	-1.061	"ergonomics", "ergonomic", "ergonomically"
86	opinion	-1.055	"opinions", "opinion", "opinionated"
87	control	-1.048	"control", "controls", "controller", "controlled", "controllers"

88	affect	-1.045	"affect", "affected", "affecting", "affects", "affection"
89	opportunit	-1.040	"opportunities"
90	situat	-1.039	"situations", "situation", "situational", "situated", "situate"
91	complet	-1.039	"completed", "complete", "completing", "completion", "completes"
92	undertak	-1.033	"undertake", "undertaking", "undertakes", "undertakings"
93	concis	-1.023	"concise", "concisely", "conciseness", "concision"
94	xd br	-1.022	"xd br", "xd same as above br", "xd and br", "xd so br", "xd these are br"
95	louder	-1.021	"louder"
96	agre	-1.021	"agreed", "agree", "agrees", "agreeing"
97	present skill	-1.017	"presentation skills", "presentation skill", "presentations skills", "presenting skills", "presentational skills"
98	vs	-1.016	"vs"
99	op	-1.007	"op", "ops"
100	qa	-1.007	"qa", "qaing"

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